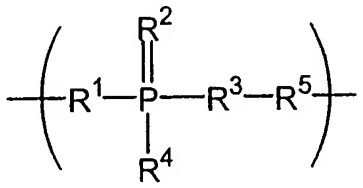
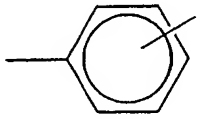
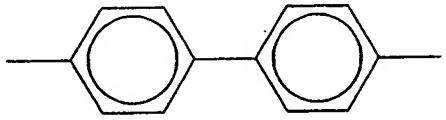
What Is Claimed Is:

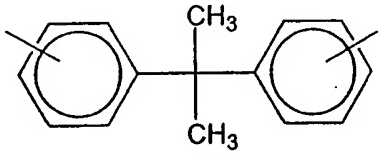
1. A phosphonate homopolymer or copolymer having units of the formula:

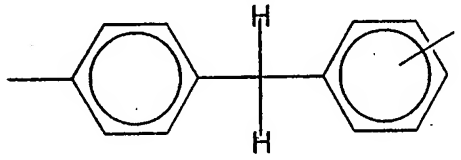


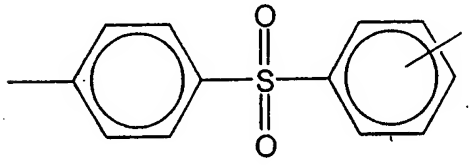
wherein R^1, R^2, and R^3 are independently O or S; at least one of R^1, R^2, and R^3 is S; R^4 is a linear or branched C_1-C_4 alkyl or C_1-C_4 haloalkyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, or cyclohexyl; and R^5 is

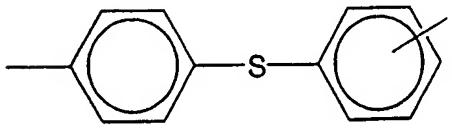
 ,

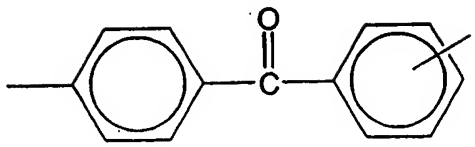
 ,

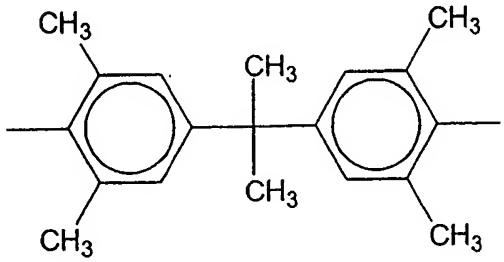
 ,

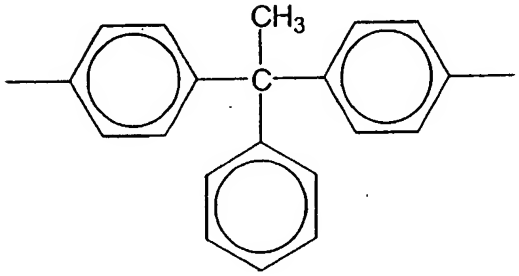
 ,

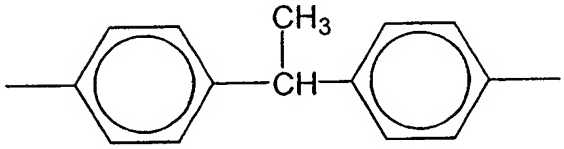
 ,

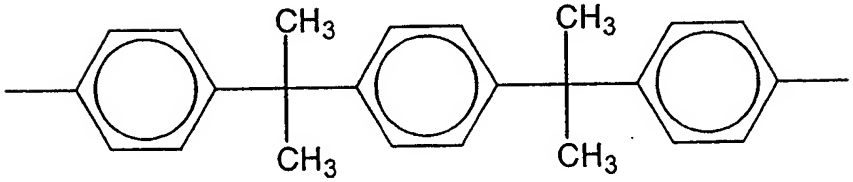
 ,

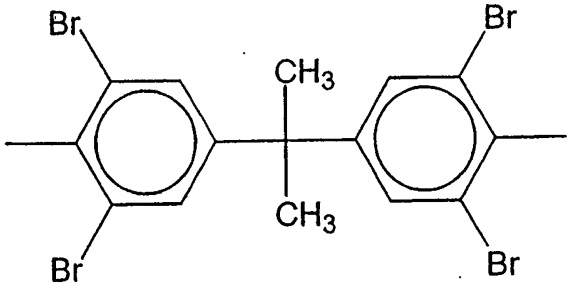
12  ,

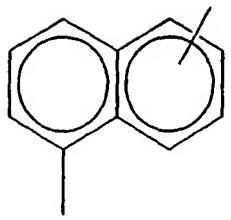
13  ,

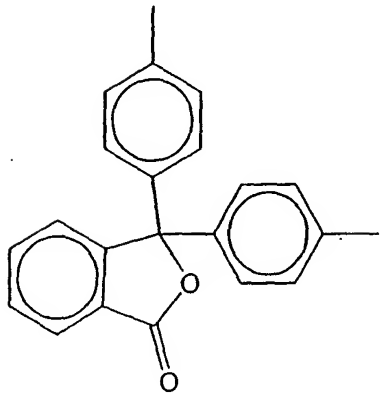
14  ,

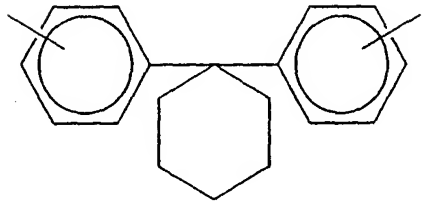
15  ,

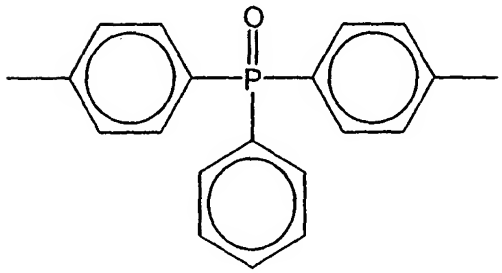
16  ,

17  ,

18  ,

19  ,

20  ,

21  ,

22 or any combination of any of the foregoing.

1 2. A phosphonate homopolymer or copolymer as defined in claim 1, wherein

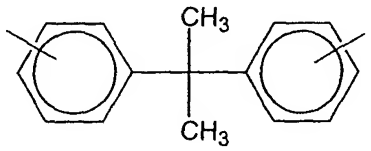
2 R^2 is S.

3. A phosphonate homopolymer or copolymer as defined in claim 1, wherein R^1 and R^3 are O.

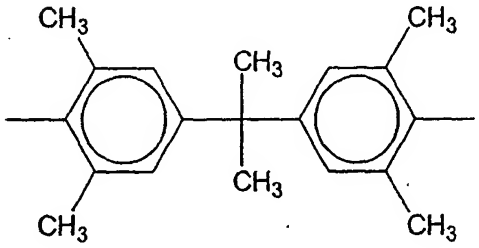
4. A phosphonate homopolymer or copolymer as defined in claim 1, wherein R^4 is selected from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, s-butyl, chloropropyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, and cyclohexyl.

5. A phosphonate homopolymer or copolymer as defined in claim 4, wherein R^4 is phenyl.

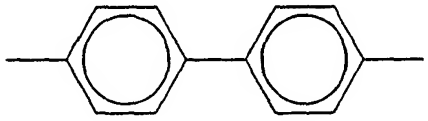
6. A phosphonate homopolymer or copolymer as defined in claim 1, wherein R^5 is



,



,

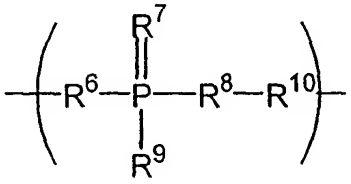

,

or any combination of any of the foregoing.

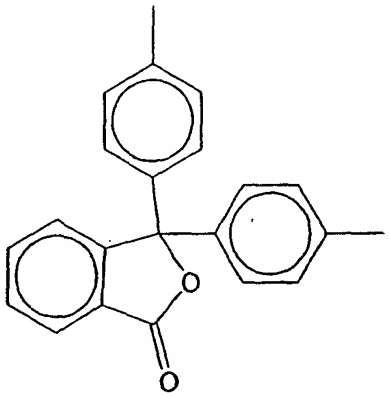
7. A phosphonate homopolymer or copolymer as defined in claim 1, wherein said copolymer is a random copolymer.

8. A phosphonate homopolymer or copolymer as defined in claim 1, wherein said copolymer is a block copolymer.

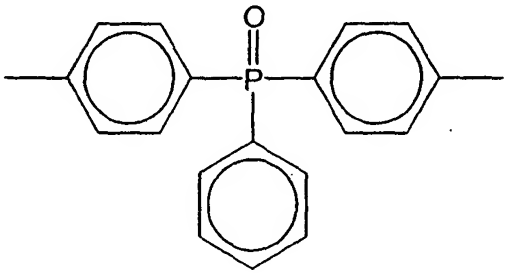
9. A phosphonate homopolymer or copolymer having units of the formula:



wherein R^6, R^7, and R^8 are independently O or S; R^9 is a linear or branched C_1-C_4 alkyl or C_1-C_4 haloalkyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, or cyclohexyl; and R^{10} is



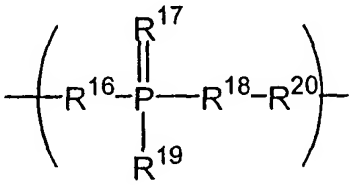
or



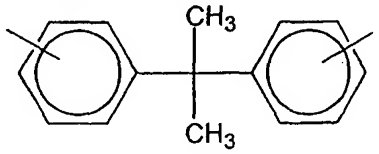
10. A phosphonate homopolymer or copolymer as defined in claim 9, wherein R^6 and R^8 are O.

11. A phosphonate copolymer comprising

(a) a first unit having the formula

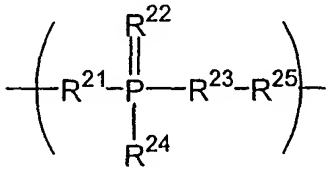


wherein R^{16}, R^{17}, and R^{18} are independently O or S; R^{19} is phenyl; and R^{20} is

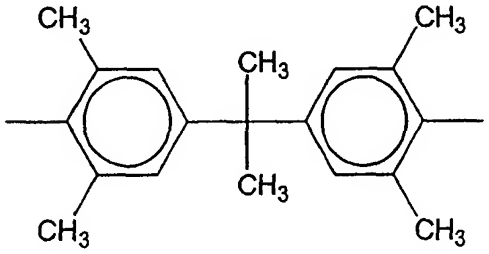


; and

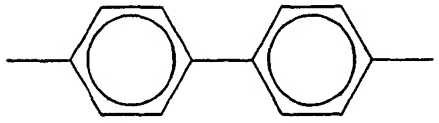
(b) a second unit having the formula



wherein R^{21}, R^{22}, and R^{23} are independently O or S; R^{24} is phenyl; and R^{25} is

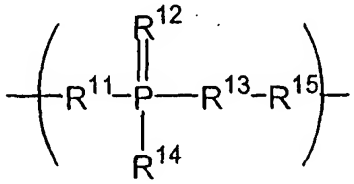


or

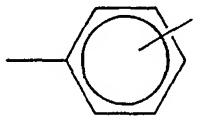


.

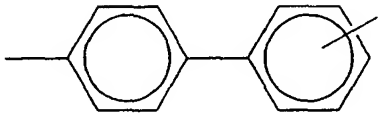
12. An optical or ophthalmic lens, said lens comprising a melt-processable phosphonate homopolymer or copolymer having units of the formula:



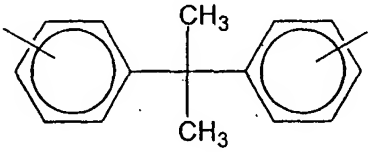
wherein R^{11}, R^{12}, and R^{13} independently are O or S; R^{14} is a linear or branched C_1-C_4 alkyl or C_1-C_4 haloalkyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, or cyclohexyl; and R^{15} is



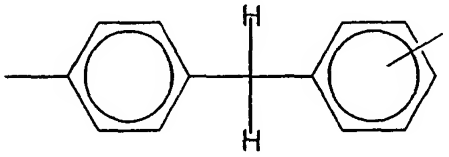
,



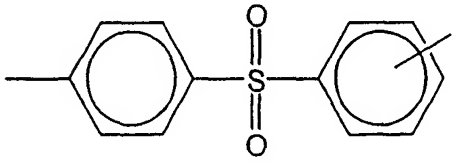
,



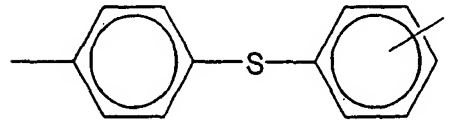
,

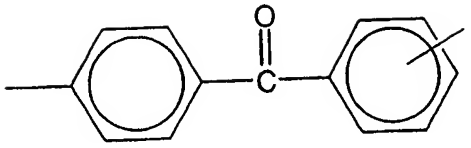


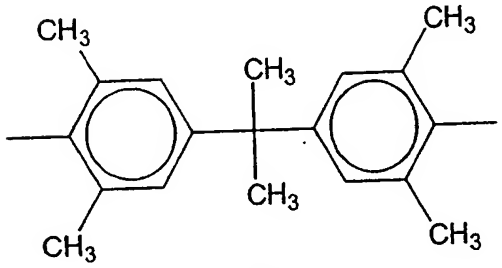
,

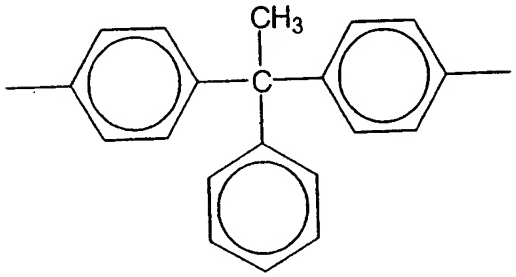


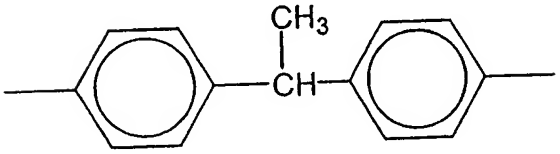
,

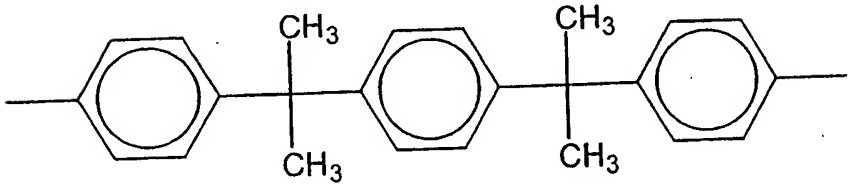


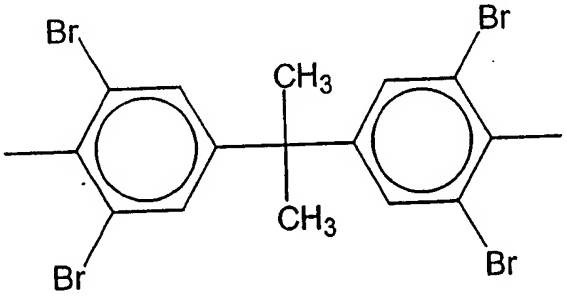
12  ,

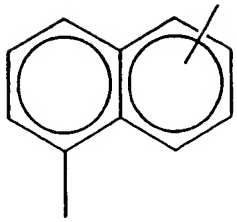
13  ,

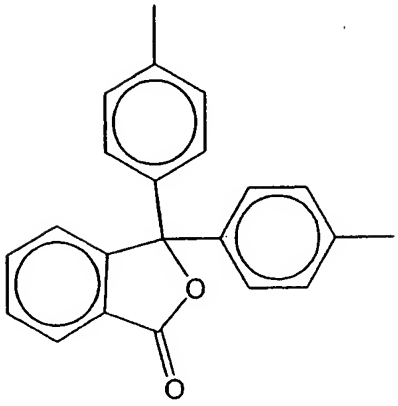
14  ,

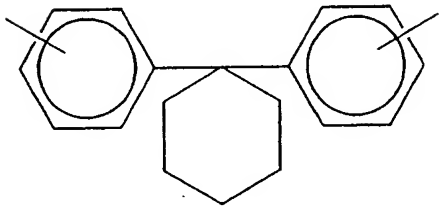
15  ,

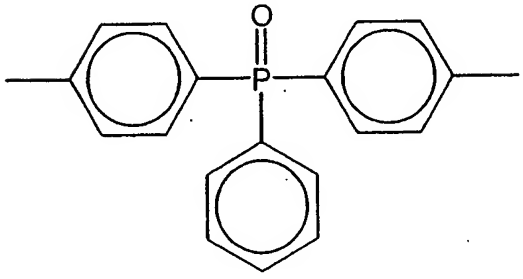
16  ,

17  ,

18  ,

19  ,

20  ,

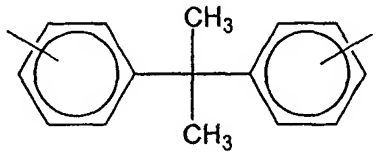
21  ,

22 or any combination of any of the foregoing.

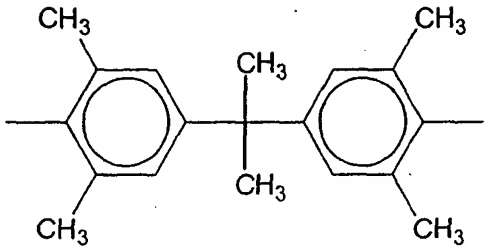
1 13. An optical or ophthalmic lens as defined in claim 12, wherein R^{14} is
2 selected from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, s-butyl,
3 chloropropyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, and cyclohexyl.

14. An optical or ophthalmic lens as defined in claim 13, wherein R^{14} is phenyl.

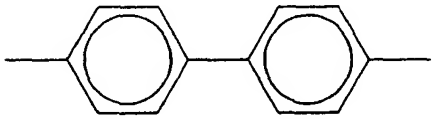
15. An optical or ophthalmic lens as defined in claim 12, wherein R^{15} is



,



,


,

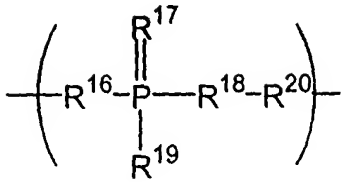
or any combination of any of the foregoing.

16. An optical or ophthalmic lens as defined in claim 12, wherein said copolymer is a random copolymer.

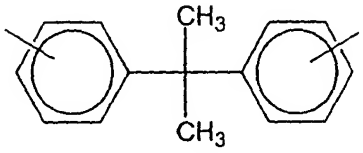
17. An optical or ophthalmic lens as defined in claim 12, wherein said copolymer is a block copolymer.

18. An optical or ophthalmic lens as defined in claim 12, wherein said copolymer comprises

(a) a first unit having the formula

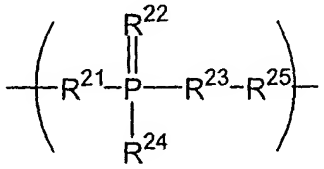


wherein R^{16}, R^{17}, and R^{18} are independently O or S; R^{19} is phenyl; and R^{20} is

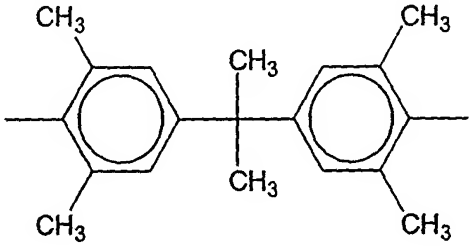


; and

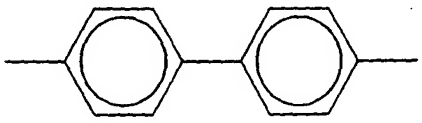
(b) a second unit having the formula



wherein R^{21}, R^{22}, and R^{23} are independently O or S; R^{24} is phenyl; and R^{25} is



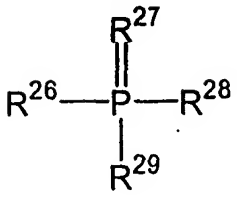
or



.

19. A method for preparing a phosphonate homopolymer or copolymer, said method comprising reacting

(a) at least one phosphonic acid halide having the formula



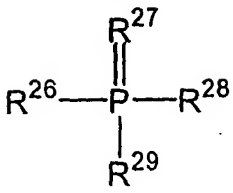
wherein R^{26} and R^{28} are independently halogens; R^{27} is S; and R^{29} is a linear or branched C_1-C_4 alkyl or C_1-C_4 haloalkyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, or cyclohexyl; with

(b) a bisphenol selected from the group consisting of hydroquinone, resorcinol, 4,4'-dihydroxybiphenyl, 4,4'-cyclohexylidene diphenol, bisphenol A, bis(4-hydroxyphenyl)methane, 2,2-bis(2-hydroxyphenyl)propane, bis P, 4,4'-bis-S, 2,2'-bis-S, 2-hydroxyphenyl-4'-hydroxyphenyl sulfone, dihydroxydiphenyl ether, bis(4-hydroxyphenyl) sulfide, bis(2-hydroxyphenyl) sulfide, dihydroxybenzophenone, 1,5-dihydroxynaphthalene, 2,5-dihydroxynaphthalene, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl) propane, thiodithiophenol, phenolphthalein, 4,4'-bis(hydroxyphenyl)phenylphosphine oxide, α,α'-bis(4-hydroxy-3-methylphenyl)-1,4-diisopropylbenzene, bis E, 2,2-bis(4-hydroxy-3-methylphenyl) propane, bis(4-hydroxy-3-methylphenyl) sulfide, dihydroxydiphenylether, 1,3-bis(4-hydroxyphenoxy) benzene, phenyl HC, t-butyl HQ, 4,4'-thiobis(t-butyl cresol), 2,2'-thiobis(4-t-octylphenol), and any combination of any of the foregoing to yield said homopolymer or copolymer.

20. A method for preparing a phosphonate homopolymer as defined in claim 19, wherein said phosphonic acid halide is selected from the group consisting of phenyl phosphonic dichloride, phenyl thiophosphonic dichloride, and any combination of any of the foregoing; and said bisphenol is bisphenol A.

21. A method for preparing a phosphonate homopolymer or copolymer, said method comprising reacting

(a) at least one phosphonic acid halide having the formula



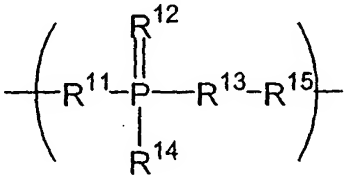
wherein R^{26} and R^{28} are independently halogens; R^{27} is O; and R^{29} is a linear or branched C_1-C_4 alkyl or C_1-C_4 haloalkyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, or cyclohexyl; with

(b) phenolphthalein or 4,4'-bis(hydroxyphenyl)phenyl phosphine oxide to yield said homopolymer or copolymer.

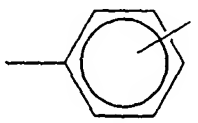
22. A phosphonate homopolymer or copolymer prepared by the method as defined in claim 19.

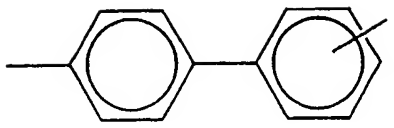
23. A phosphonate homopolymer or copolymer prepared by the method as defined in claim 21.

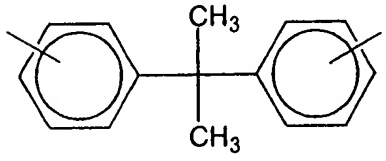
24. A method for preparing an optical or opthalmic lens, said method comprising injection molding into the form of said lens, a melt-processable phosphonate homopolymer or copolymer having units of the formula:

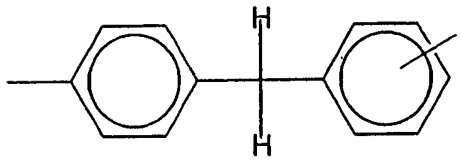


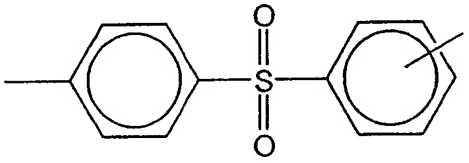
wherein R^{11}, R^{12}, and R^{13} independently are O or S; R^{14} is a linear or branched C_1-C_4 alkyl or C_1-C_4 haloalkyl, phenyl, chlorophenyl, p-tolyl, benzyl, biphenyl, or cyclohexyl; and R^{15} is

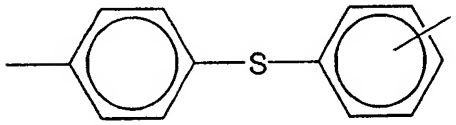


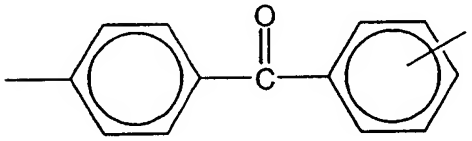
8  ,

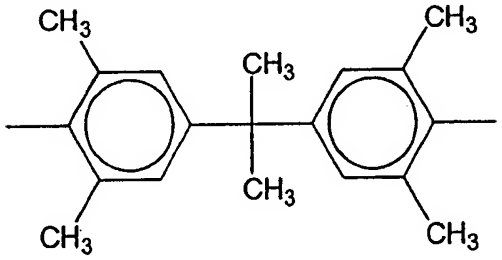
9  ,

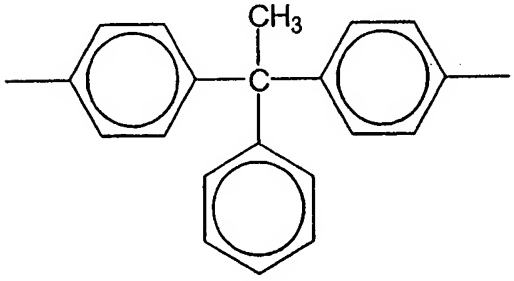
10  ,

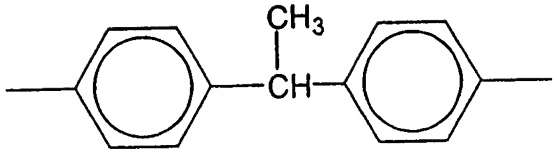
11  ,

12  ,

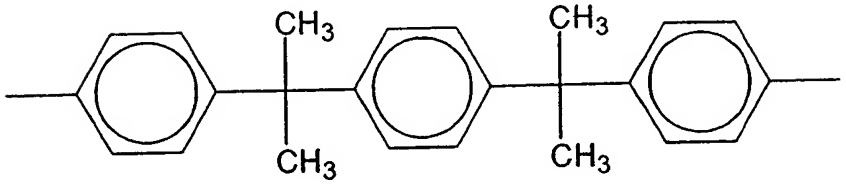
13  ,

14  ,

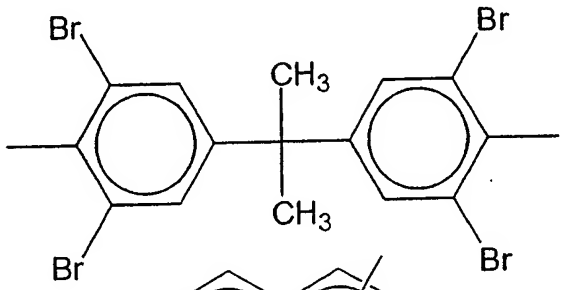
15  ,

16 

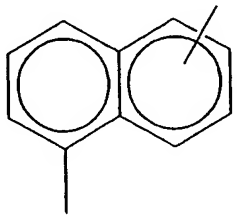
,

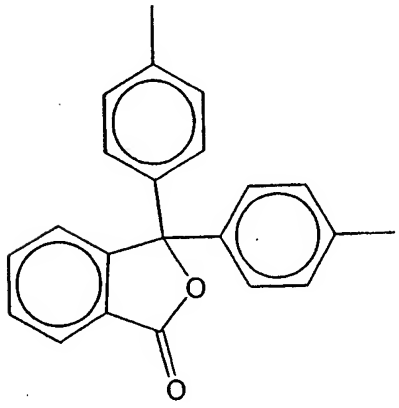
17 

,

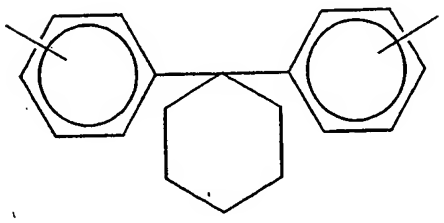
18 

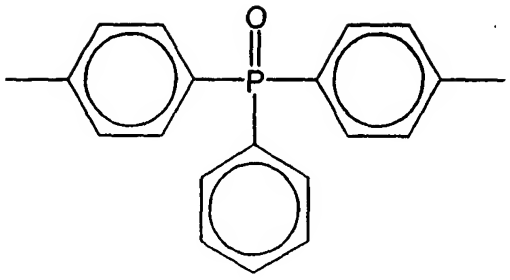
,

19 
,

20 

,

21 
,

22 

23 or any combination of any of the foregoing.